NOTES ON CLIMATOLOGY.

BY

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THE RELATIVE HUMIDITY OF OUR HOUSES IN WINTER.—While it is generally agreed that the air of our furnace-heated houses is much too dry in winter, few persons realize what the amount of moisture in this air actually is, and how it compares with that in the air under certain natural conditions out of doors. In the *Journal of School Geography* for September, R. DeC. Ward has a short article on "The Relative Humidity of our Houses in Winter," in which the results of some simple observations along this line are given. The observations in question were made by means of a sling psychrometer in the writer's study, which is heated by an ordinary hot-air furnace, provided with the usual small evaporating pan. From three to five observations were made daily during three weeks in the month of November, each observation including the temperature of the room, the relative humidity within the room, the temperature and relative humidity of the outside air, the amount of ventilation by means of the windows, and the quantity of heat coming from the furnace.

The mean relative humidity for the whole period of three weeks was 30%. The mean relative humidity of the outside air was 71%, or 41% in excess of that indoors. The maximum relative humidity indoors for a whole day was 40%, recorded on a rainy day, with the window open, and with a moderate fire in the furnace. The relative humidity outdoors on this same day averaged 87%. The minimum relative humidity for a whole day was 24% indoors, the weather being clear and cold, and the windows shut most of the day. On this same day the relative humidity outside averaged 51%.

Comparing the relative humidity of the room in which the observations were made with that of the outside air in different places, we find the following facts: For almost all of the United States east of the Mississippi river the normal annual relative humidity is between 70% and 80%, and it is only in the southwest (New Mexico, Arizona, and southern Nevada, Utah, and Colorado) that the annual mean is below 50%. The lowest mean annual relative humidities in the United States are those for the Weather Bureau stations

in the dry southwest. Yuma, Ariz., has a mean annual relative humidity of 42.9%, with a mean monthly minimum of 34.7% in June. Santa Fé, New Mexico, has a mean annual of 44.8%, with a mean monthly minimum of 28.7% in June. Pueblo, Colo., has a mean annual of 46.2%, with a mean monthly minimum of 37.6% in April. Death Valley, Cal., was found to have a mean relative humidity of 23% during five months (May–September) of the year 1891, when a temporary meteorological station was maintained there by the United States Weather Bureau. During this same period the mean temperature was 94°.

Southwestern Siberia and western Turkestan have a mean relative humidity of 45–50% in July. Yarkand, in eastern Turkestan, has a July mean of 47%. In the arid region in the neighbourhood of the Sea of Aral, Nukus (lat. 42.5° N., long. 59.6° E.), has a June mean of 46%, and a 2 P.M. June mean of 19%. Petro-Alexandrovsk, a degree and a half east of Nukus, in the desert (lat. 41.5° N., long. 61.1° E.), has a mean of 34% in June. Kasalinsk (lat. 45.8° N., long. 61.2° E.) has a mean of 45% in July. The air is still drier in the deserts near the equator. Ghadames, in Tripoli, has 27% in July, and 33% in August, and the Kufra Oasis has 27% in August, with a 3 P.M. August mean of 17%. In the Punjab and northwestern India, Lahore has 31%, and Agra has 36%, in May.

These data show that the air of the room in which the observations were made, and which may be taken as fairly typical of the air in most rooms in which we live and work in winter, was drier than that of many desert regions. That so dry an atmosphere is not healthy, especially in our winter climate, there is no need of argument to prove. The low relative humidity means excessive evaporation from skin, lungs, and respiratory passages. Catarrhal affections, and other throat difficulties, may easily follow. Furthermore, the strain which is put upon the body in the rapid adjustment which it has to make when we go out from the high temperatures and desert aridity of our houses in winter into a temperature, it may be 70°, 80°, or even 90° lower, and a relative humidity of 70 to 100%, is a very great one. As long as the air in our houses is so very dry, most persons are not comfortable unless the thermometer records about 70°, or even more. The dry air involves rapid evaporation from the surface of the body, and this means that we feel cool. Hence the desire to have our room temperatures kept well up to 70°, when, if the air were reasonably moist, we should feel comfortable at 65°, or thereabouts.

RAINFALL VARIATIONS.—A valuable study of the variations of rainfall during long periods of time has been made by Professor Hann, of Vienna, in a paper entitled "Die Schwankungen der Niederschlagsmessungen in grösseren Zeiträumen" (*Sitzungsber. Wien. Akad. Wiss.*, *CXI*, 11a, 1902). In this discussion the data used were the monthly and annual mean rainfalls of Padua (from 1725 to 1900); Klagenfurt (from 1813 to 1900), and Milan (from 1764 to 1900). For the past hundred years (1801 to 1900) the annual extremes expressed in percentages of the general mean are as follows:

	PADUA.	KLAGENFURT.	MILAN.
Driest year.....	58	42	62
Wettest year	152	151	152

If the wet and dry years of the last century are classified according to their percentage departures from the general mean, the following table is obtained:

Character.....	Very dry.	Dry.	About normal.
Per cent	51–70	71–90	91–110
Number.....	8	26	37
Character.....	Wet.	Very wet.	Extraordinarily wet.
Per cent	111–130	131–150	over 150
Number.....	22	6	1

The dry years are seen to number 34 per cent., and the wet years 29 per cent. The rainfall of the wet years, however, departs to a greater extent from the mean value than does that of the dry years. When the mean epochs of these dry and wet periods are determined, it appears that they show a 35-year periodicity, the maxima and minima coming in the following years:

Wet.....	1738	1773	1808	1843	1878	(1913)
Dry.....	1753	1788	1823	1859	1893	(1928)

This period corresponds with the 35-year period of Brückner.

BLUE HILL OBSERVATIONS FOR 1899–1900.—A record of good work continued, and of the successful prosecution of studies along new lines is evidenced in the "Observations and Investigations made at the Blue Hill Meteorological Observatory in the Years 1899 and 1900" (*Annals Harv. Coll. Obsy.*, LXIII, Pt. II, 1902). The contributions to meteorology which have been made by the meteorologists of the Blue Hill Observatory are well known the world over. A striking bit of evidence as to this fact is contained in the bibliography of the most important articles relating to the Observatory

and its work, published by members of its staff and others during the last five years, in which it will be seen how widely the Blue Hill publications are read, and how highly they are valued, by noting the numerous reviews that have appeared of these contributions to science. The present volume contains the regular observations for 1899 and 1900; a summary for the lustrum 1896–1900; an interesting discussion, by Mr. A. E. Sweetland, of the visibility of distant objects as affected by meteorological conditions, based on five years' observations, and a discussion, by the same writer, of the temperatures recorded at Milton during the past fifty years. These two discussions are naturally chiefly of local interest, but they show that every opportunity to advance the science of meteorology is made good use of at Blue Hill.

The greatest work which the Blue Hill Observatory, through Mr. A. Lawrence Rotch, its energetic proprietor, now has in hand is the exploration of the free air over the oceans by means of kites flown from the deck of a steamer. None of the numerous scientific expeditions of the present time promises to yield such a rich harvest of meteorological discovery as this marine expedition which Mr. Rotch has planned, and proposes soon to carry out.